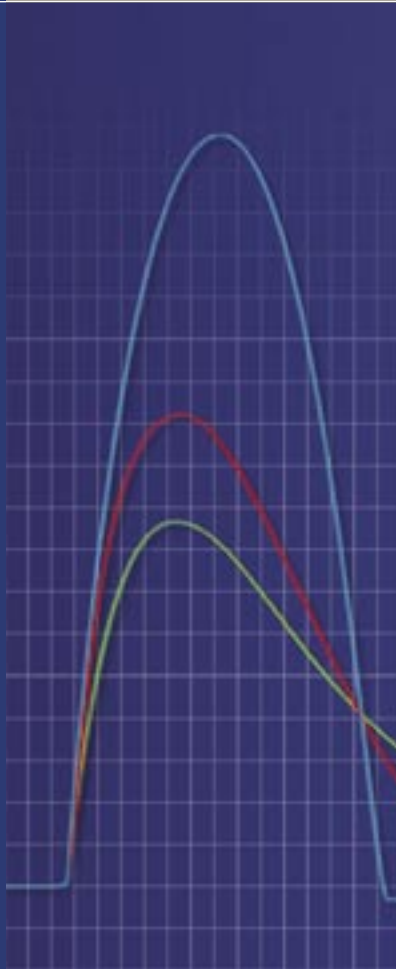


Smart choice for power

xantrex



Modular Power System



Xantrex Multiple Output Power System XMP 2600

www.xantrex.com

Multiple Output Programmable DC Power Supply System



The Xantrex Modular Power System (XMP 2600) is a multiple-output programmable DC power supply system. The system is an ideal solution for ATE applications.

A 19" x 5 1/4" (3U high) mainframe, the XMP includes a controller and can be configured with a selection of up to eight modules. For added flexibility, modules of different power ratings can be combined within the same XMP mainframe. The system automatically reconfigures itself when new modules are installed.

The modules come in a variety of sizes and power ratings: 1/8 width, ranging from 160 W to 720 W; 2/8 width, ranging from 640 W to 1.6 kW; and 3/8 width high power modules ranging from 2.8 kW to 3.2 kW, limited by the XMP mainframe power envelope.

xantrex

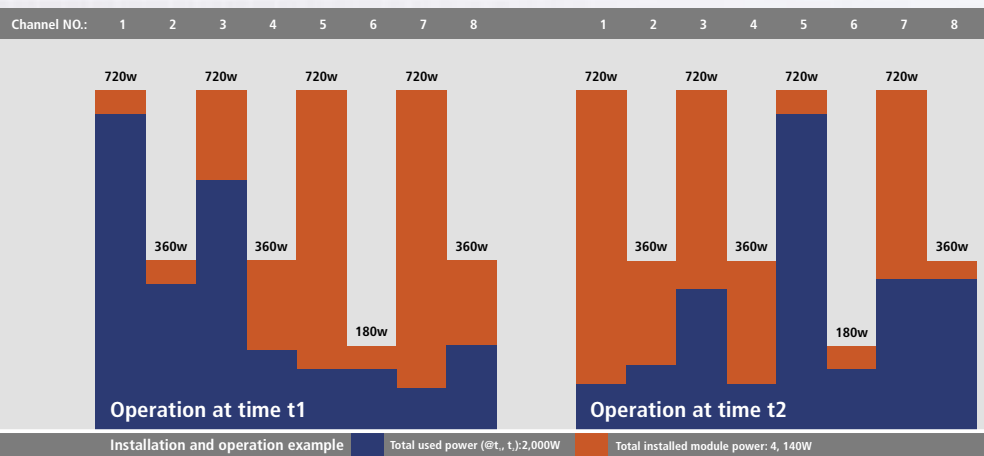
The XMP mainframe can be populated with modules having an overall power of several kW. Within the power envelope of the XMP mainframe, output power can be drawn from different modules at different times. No other single power system has this flexibility.

All XMP functions can be programmed through a GPIB (IEEE-488) or RS-232 interface, or manually commanded and monitored from the front panel for convenient hands-on operation. LabVIEW®, LabWindows/CVI®, TestPoint® and AtEasy® drivers are available for easy integration of these functions in a customized system. The XMP comes with a convenient virtual panel and tutorial software.

Contents

▶ Introduction	
▶ Product Features	1
▶ Programming	2
▶ Offloading the ATE Controller	3
▶ System Functions	4
▶ XMP 2600 Illustration	6
▶ Protection Features	8
▶ General Specifications	9
▶ Modules Specifications	10
▶ Mechanical Specifications	12
▶ Ordering	

Power flexibility: 2.4 kW continuous, 2.6 kW intermittent



The XMP offers power flexibility, allowing users to draw available power from different channels at different times from the same power system.

It is available with 2.4 kW continuous and 2.6 kW intermittent usable power.

To ensure the power envelope is not violated, the XMP controller constantly monitors the power system. In case of a brief violation, it provides up to 30 seconds of overall power for up to 30 seconds and automatically alerts the host. In case of a severe violation (above 2.6 kW), it will automatically shut down the power system.

An XMP mainframe will hold 6 kW of power modules.

Product Features

- ▶ GPIB or RS-232 controlled
- ▶ 19" x 51/4" (3 U high) mainframe with controller to accommodate up to 8 modules
- ▶ 1/8, 2/8, and 3/8 width modules available ranging from 8 v to 160 v and 1.25 A to 80 A
- ▶ Individual module processor control
- ▶ Power envelope: 2.4 kW, 2.6 kW intermittent
- ▶ Power envelope monitoring and control
- ▶ Polarity and isolation relays
- ▶ Readback of voltage and current
- ▶ External synchronization
- ▶ Extensive DUT protection features
- ▶ Workpoint window warning
- ▶ Multichannel 10 store/recall locations
- ▶ 99 steps auto sequencing
- ▶ Software-based calibration
- ▶ Local panel and keyboard
- ▶ Low ripple and noise
- ▶ Power Factor Correction (PFC), wide range mains operation

Programming



The XMP is programmable by using a simple set of commands via GPIB or RS-232C communication links. Its extensive command set covers all of the XMP features and complies with the IEEE488.2 standard. LabVIEW®, LabWindows/CVI®, TestPoint® and AtEasy® drivers are available for easy integration.

Programmable Functions

- ▶ Voltage and current setting
- ▶ OV and OC protection
- ▶ Individual and global output ON/OFF
- ▶ Built-in output relays
- ▶ Five current limit types
- ▶ Work point window warning
- ▶ Re-programming delay
- ▶ Local panel lockout
- ▶ Power-on values retain or initialize
- ▶ Multi-channel store and recall settings
- ▶ Output synchronization
- ▶ Maskable events and SRQ generation
- ▶ Selectable response to controller's communications time-out
- ▶ Versatile modules shut-down on-fault setups
- ▶ Two-level, six frequencies simulated ripple

Readback Functions

- ▶ Load voltage, output voltage and load current readback
- ▶ All programmed parameters
- ▶ System and channel status
- ▶ System and channel errors
- ▶ Synchronization Command Execution

Standard Power Modules

(Custom modules available upon request)

Width:	1/8	1/8	1/8	2/8	3/8
0-8 V	20 A	40 A		80 A	
0-18 V	10 A	20 A	40 A	80 A	
0-36 V	5 A	10 A	20 A	40 A	80 A
0-80 V	2.5 A	5 A	9 A	20 A	40 A (*1)
0-160 V	1.25 A	2.5 A	4.5 A	10 A	20 A (*1)

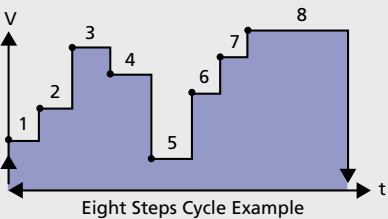
(*1) – The maximum output power is limited by the mainframe controller.

A custom power system for ATE applications

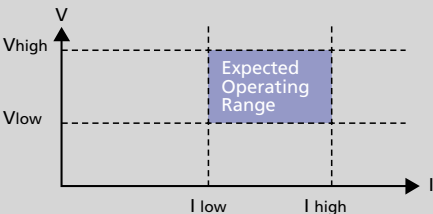
The XMP is a single chassis solution to meet your power needs. Simply customize a system by choosing modules with desired voltage and current ratings. You can even combine high and low power modules in the same XMP mainframe.

Offloading the ATE controller

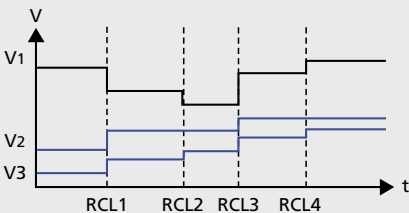
Auto Sequence Operation Test sequences can be executed for autonomous operation by using recall states of varying duration.



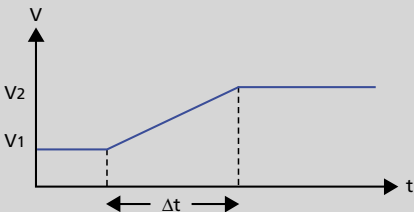
Work Point Window Warning The XMP can continuously monitor the voltage and current to stay within programmed levels, offloading your controller from routine checks. As a limit value is reached, an SRQ is generated over the GPIB and the event is reported.



Multichannel Store and Recall Settings Up to ten multi-channel settings can be stored and recalled, either manually or via the GPIB (or RS-232) control interface. The values are stored in a battery backed up memory.



Ramp Function When searching for certain DUT reaction points within a range, ramp up or down (voltage or current) by programming initial value, time interval and final value. This helps to avoid tedious programming loops and traffic over the GPIB control interface.



OPERATION COMPLETE Indication The sytem reports an OPERATION COMPLETE event, avoiding unnecessary fixed delays or check loops. This feature also provides automatic synchronization (e.g. change the output of module 2 when module 4 has finished ramping).

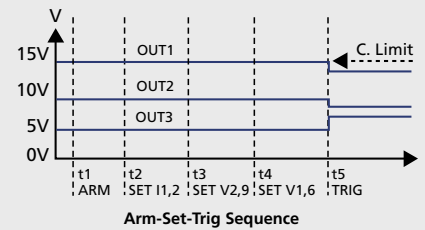
Automatic Polarity Reversal When enabled, a module's output voltage can be programmed using a signed value (e.g. -3.52), eliminating the need to check for the requested polarity and to send a polarity command.

System Functions

Synchronization

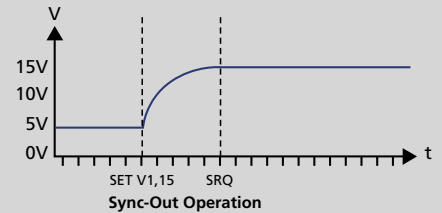
The synchronization of a single or multiple operation can be achieved with hardware or software.

Hardware trigger-in (or software trigger command) allows synchronization of the multi-channel reaction. Just “ARM” the modules and program the new parameters. Execution takes place at trigger arrival.



The OPERATION COMPLETE mechanism provides synchronized serialization of operations.

A sync-out provision for COMMAND PERFORMED external synchronization avoids fixed delays and gives the ATE system the fastest performance.



ON/OFF Control

The XMP system can be shut down by applying a voltage or by shorting two pins at the ON/OFF rear connector. Positive or negative logic can be used. Applications include PANIC SWITCH, hardware emergency shutdown, etc. An output floating contact shuts down external units and displays the ON indication.

Polarity and Isolation Relays

Relays for output disconnection and for polarity reversal are standard (modules without relays are available). The relays may be operated by specific user requests or programmed to operate automatically when appropriate.

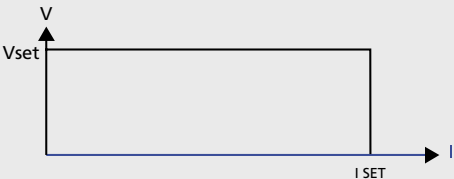
Simple, Software-Based Panel Calibration

The XMP can be calibrated on site and takes only minutes using a calibrated multimeter, a calibrated shunt and a load. The calibration mode access is password protected.

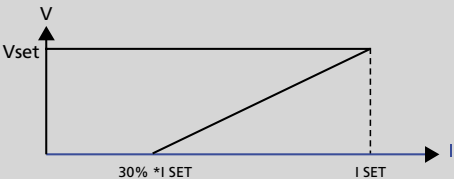
Current Limitation Versatility

According to the load (DUT), the user may select the most suitable protection from the following five options:

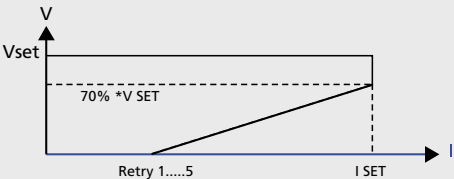
Constant voltage with current limited to the I_{set} value, or Constant Current with voltage limited to the V_{set} value.



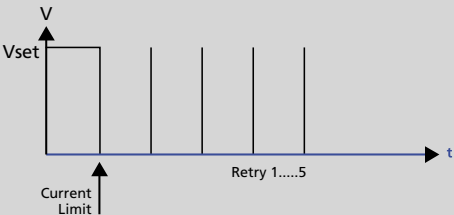
Foldback to 30% of the current limit for low short-circuit current.



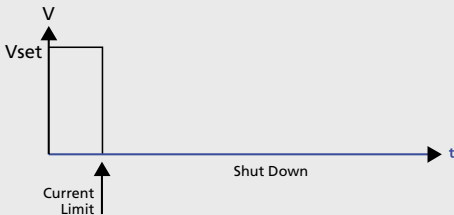
Constant voltage with current limit and foldback for special power supply simulation.



Retry: When the current limit is reached, the corresponding output is shut down for three seconds, then restored again. Following five consecutive current limit events, the corresponding output will shut down.



Single event shutdown for extra-sensitive loads: when the current limit value is reached, the corresponding output is shut down.



Control board for driving external hardware

An optional 1/8-size driver module can be combined with the power modules in the mainframe for easy control of external hardware such as relays. The module offers eight open collector outputs capable of sinking up to 1 A each, along with auxiliary 12 V, 24 V and 48 V outputs.

XMP Modular Power System

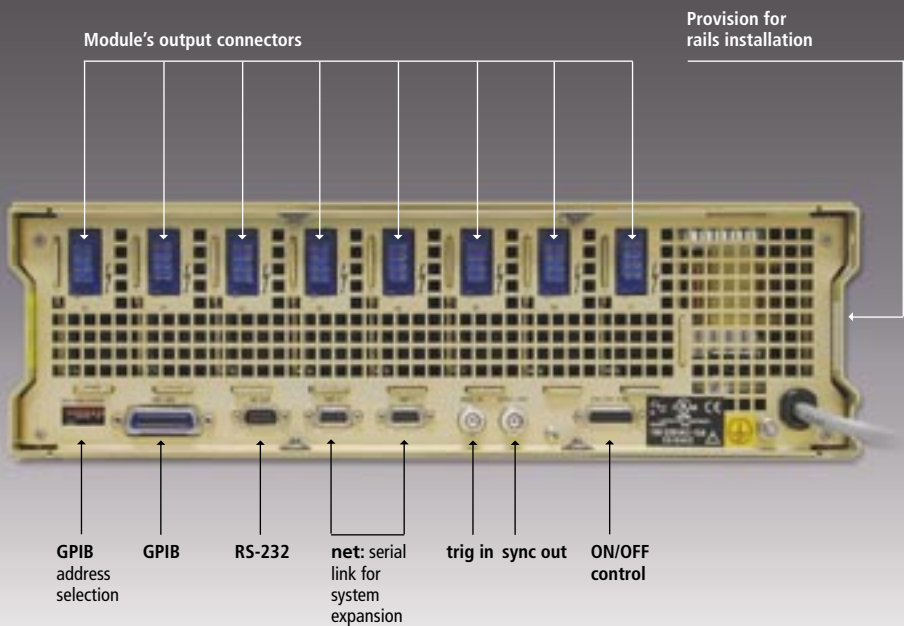
The XMP 2600 power system can expand to provide up to 16 outputs. It delivers up to 38 kW under a single GPIB address (or RS-232 link), by adding one or more extension slave units to the XMP mainframe with controller. Simply inter-connect between the master chassis and the slave chassis via the net (proprietary communication data link) connector at the rear panel. There are no operational differences between internal and external power modules.



Handles for physical protection and ease of handling.

Mains – On indication

ON/OFF
ON/OFF automatic circuit breaker. Self-test procedure is carried out at power-on.



Module's output connectors

Provision for rails installation

GPIB address selection

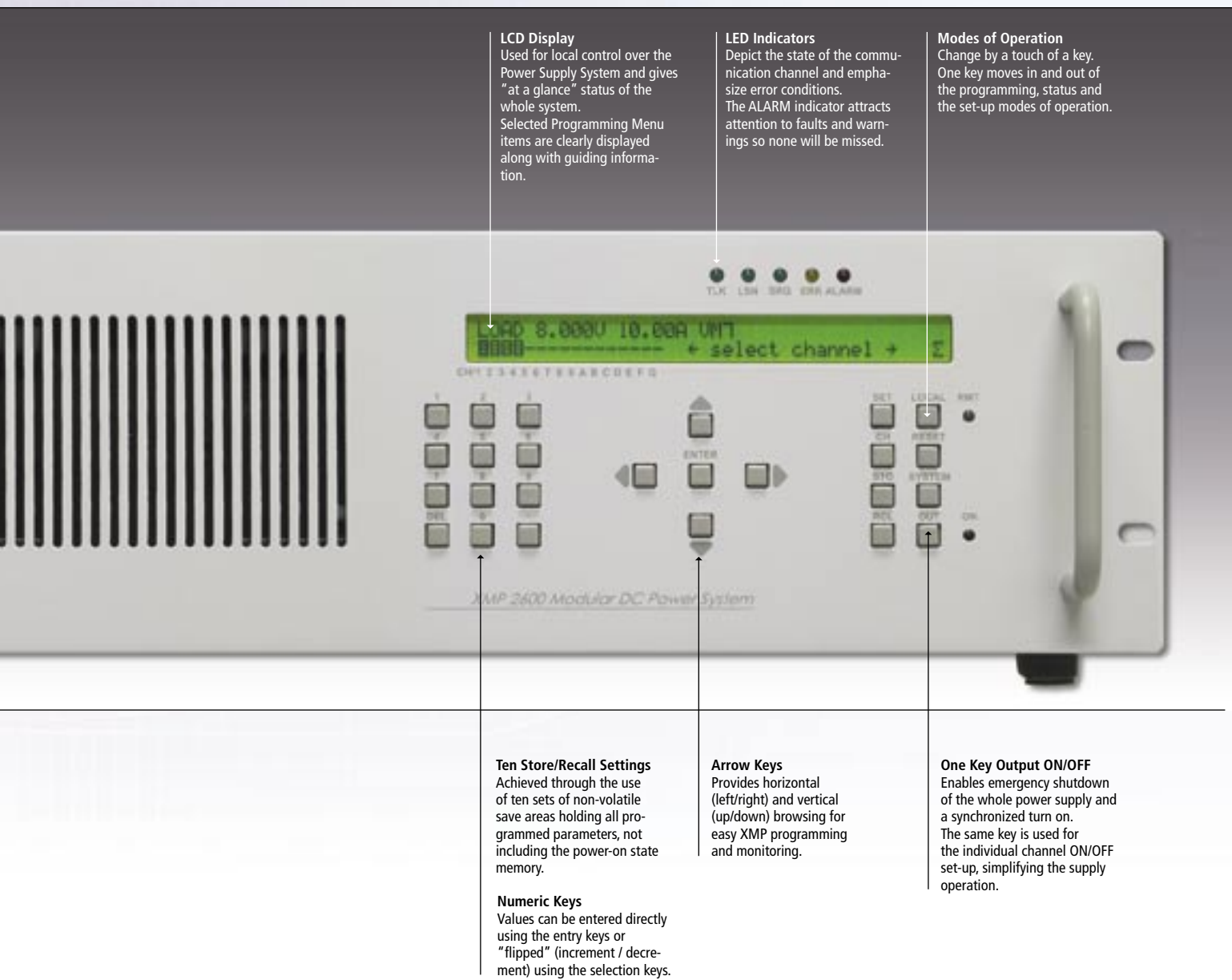
GPIB

RS-232

net: serial link for system expansion

trig in sync out

ON/OFF control



LCD Display

Used for local control over the Power Supply System and gives "at a glance" status of the whole system. Selected Programming Menu items are clearly displayed along with guiding information.

LED Indicators

Depict the state of the communication channel and emphasize error conditions. The ALARM indicator attracts attention to faults and warnings so none will be missed.

Modes of Operation

Change by a touch of a key. One key moves in and out of the programming, status and the set-up modes of operation.

Ten Store/Recall Settings

Achieved through the use of ten sets of non-volatile save areas holding all programmed parameters, not including the power-on state memory.

Numeric Keys

Values can be entered directly using the entry keys or "flipped" (increment / decrement) using the selection keys.

Arrow Keys

Provides horizontal (left/right) and vertical (up/down) browsing for easy XMP programming and monitoring.

One Key Output ON/OFF

Enables emergency shutdown of the whole power supply and a synchronized turn on. The same key is used for the individual channel ON/OFF set-up, simplifying the supply operation.

Protection Features

▶ Power-up self-test

At power-up, the XMP runs an extensive self-test routine to assure proper functioning.

▶ On-the-fly self-tests

As the system operates, self-tests are constantly being performed, without interfering with normal operation.

▶ User initiated self-tests

Upon user request, the XMP performs an extensive self-test without interfering with normal operation.

▶ Five programmable current limitations

For optimal load protection, one of five types of current limitation can be programmed for each output.

▶ Automatic (or programmable) OV and OC protection

Over Voltage and Over Current protection values are user programmable. By default they are auto tracking, being $V_{set}+10\%$ for the voltage protection, and $I_{set}+10\%$ for the current protection. In the event of OV or OC, the corresponding output shuts down.

▶ Sense disconnect protection

Sense lines are provided to compensate for distribution lines voltage drops. Immediate module shut down occurs in the event of excessive voltage drop on the sense lines.

▶ Output disconnect relays

In case of channel shutdown, the output relays disconnect immediately.

▶ Selectable output group shuts down together in case of failure

Modules that are grouped together shut down if any one of the modules fails.

▶ Programmable shutdown on non-fault events

The XMP can treat non-fault events (i.e. warning events) as faults and activate its shutdown mechanism. For example, combining this feature with the work point window warning mechanism provides UVP and UCP.

▶ Local operation lockout

Prevents unintentional programming from the front panel.

▶ Global ON/OFF

Removing power from all outputs is as easy as pressing a button, or sending the OUT 0 command.

▶ Programmable events generation

Protection faults and warning alarms can generate SRQ over the GPIB. The activating conditions (mask) for the alarms and the SRQ generation are user programmable.

▶ Controller communications monitoring

When communications with its controller have timed-out, a variety of responses can be selected for the XMP.

▶ ON/OFF output hardware indication

A hardware output indication is provided regarding the operation of the system. In the event of a failure, this feature allows you to turn off other equipment.

▶ Over heating protection

In case the temperature rises over the allowed level, the system is shut down until the temperature decreases sufficiently. Then the system resumes operation.

▶ Power envelope protection

The overall power available from the XMP is continuously monitored. If the 2.4 kW limit is briefly violated (up to 2,600 W for up to 30 sec.), the host is alerted. If the power limit is severely violated (either more than 2.4 kW for longer than 30 sec. or more than 2.6 kW peak power) the system alerts the host and shuts down.

▶ Mains voltage out-of-range protection

The XMP will shut down when the mains is out of voltage range.

▶ Low Acoustic Noise Operation

The XMP's unique cooling strategy operates silently by independently controlling the speed of each of its three fans.

▶ Active current sinking for fast response

It discharges output/load capacitors at down-programming.

▶ Power Factor Correction (PFC)

Keeps the mains current to a minimal value with reduced harmonic distortion (IEC555).

General Specifications

Mains Operation

AC Input	
170 V-265 V	I _{in} < 20 A nominal
Nominal 120 V, P _o < 1 kW	I _{in} < 15 A nominal

* Below the minimum specified input voltage range, consult factory for derating information.

Mains frequency	45 to 66 Hz
Power cord length	2 m
Power Factor Correction (PFC)	Power factor correction to meet EN61000-3-2 Current Harmonics and EN61000-3-3 Voltage Fluctuations (IEC555)
Inrush Current	Up to 100% of specified nominal current
Input Mains Protection	Circuit breaker switch on the front panel

Environmental Conditions	
Storage temperature	-20°C to 70°C
Operating temperature	0°C to 55°C (LCD to 50°C)
Derate output current/power	1% per °C from 30°C to 55°C

Regulatory Approvals	
European Standards:	Electromagnetic Emissions and Immunity - meets Council Directive 89/336/EEC
Electromagnetic Emissions:	EN61326: 1997 + A1: 1998
	EN61000-3-2: 2000
	EN61000-3-3: 1995
Electromagnetic Immunity:	EN61326: 1997 + A1: 1998

Safety Agency Compliance	
European Standards:	
Safety	Meets EN61010-1
American Standards:	
Electromagnetic Emissions	Meets FCC Class A
Safety	Meets UL61010-1

Temperature Coefficient	
Voltage Programming	0.01% per °C
Current Programming	0.02% per °C
Voltage Readback	0.01% per °C
Current Readback	0.02% per °C
Long Term Drift	Output change after 30 min. warm-up, over an interval of 8 hours under constant load, line and temperature conditions is 0.03%.
Remote Sensing	Up to 4 V can be dropped over the two load lines together (i.e. 1.5 V + 2.5 V). At 2.5 V a warning event will be generated, alerting over sense voltage drop condition, and at 4V the module will be shut down. The load lines drop subtracts from the voltage available for the load.
Output Programming Response Time	Rise and fall time with full resistive load (10 to 90% and 90 to 10%) is 30-640 mSec.
Isolation	Output terminals can be floated up to +/- 240 VDC from chassis ground

Warranty	
Three years	

* Data subject to change without notice.

Modules Specifications^{*(1,2)}

Module Order Code	A1	B1	C1	D1	E1	A2	B2	C2	D2	E2
Module width	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8
Output Ratings										
Power	160 W	180 W	180 W	200 W	200 W	320 W	360 W	360 W	400 W	400 W
Voltage	8 V	18 V	36 V	80 V	160 V	8 V	18 V	36 V	80 V	160 V
Current	20 A	10 A	5 A	2.5 A	1.25 A	40 A	20 A	10 A	5 A	2.5 A
Programming Accuracy										
Voltage (0.03% of Vmax+...)	3 mV	7 mV	12 mV	26 mV	60 mV	5 mV	10 mV	15 mV	30 mV	65 mV
OVP (2% of Vmax+...)	90 mV	180 mV	340 mV	740 mV	980 mV	90 mV	181 mV	342 mV	744 mV	988 mV
Current (0.12% of Imax+...)	8 mA	4 mA	2 mA	1 mA	0.5 mA	24 mA	9 mA	5 mA	3 mA	2 mA
OCP (2% of Imax+...)	16mA	8 mA	4 mA	2 mA	1 mA	32 mA	16 mA	8 mA	4 mA	2 mA
Average Programming Resolution										
Voltage	2.5 mV	12 mV	15 mV	24 mV	122 mV	2.5 mV	12 mV	15 mV	24 mV	122 mV
OVP	2.5 mV	12 mV	15 mV	24 mV	122 mV	2.5 mV	12 mV	15 mV	24 mV	122 mV
Current	15 mA	12.5 mA	2.25 mA	1.63 mA	1.31 mA	20 mA	15 mA	12.5 mA	2.25 mA	1.63 mA
OCP	15 mA	12.5 mA	2.25 mA	1.63 mA	1.31 mA	20 mA	15 mA	12.5mA	2.25 mA	1.63 mA
Ripple and Noise (20 Hz to 20 MHz)										
Rms	1.8 mV	2 mV	2.5 mV	7 mV	12 mV	2 mV	2.5 mV	4 mV	12 mV	25 mV
Peak-Peak	12 mV	14 mV	19 mV	42 mV	85 mV	13 mV	15 mV	25 mV	70 mV	150 mV
Load Regulation										
Constant voltage	1.5 mV	1.8 mV	2 mV	3 mV	6 mV	1.5 mV	2 mV	2.5 mV	4 mV	7 mV
Constant current	8 mA	4 mA	2 mA	1 mA	0.5 mA	18 mA	10 mA	6 mA	3 mA	2 mA
Line Regulation										
Constant voltage	2 mV	2.5 mV	3 mV	4 mV	6 mV	2.5 mV	3 mV	3.5 mV	5mV	7 mV
Constant current	8 mA	4 mA	2 mA	1 mA	0.5 mA	18 mA	10 mA	6 mA	3mA	2 mA
Readback Accuracy										
Voltage readback (0.03% of Vmax+...)	6 mV	12mV	23 mV	42 mV	85 mV	12 mV	24 mV	46 mV	90 mV	180 mV
Current readback (0.12% of Imax+...)	8 mA	4mA	2 mA	1 mA	0.5 mA	26 mA	9 mA	5 mA	3 mA	2 mA
Average Readback Resolution										
Voltage readback	2.5 mV	12mV	15 mV	24 mV	122 mV	2.5 mV	12 mV	15 mV	24 mV	122 mV
Current readback	15 mA	12.5mA	2.25 mA	1.63 mA	1.31 mA	20 mA	15 mA	12.5 mA	2.25 mA	1.63 mA

A4	B3	C3	D3	E3	B4	C4	D4	E4	C5	D5	E5
2/8	1/8	1/8	1/8	1/8	2/8	2/8	2/8	2/8	3/8	3/8	3/8
640 W	720 W	720 W	720 W	720 W	1,440 W	1,440 W	1,600 W	1,600 W	*(4)	*(4)	*(4)
8 V	18 V	36 V	80 V	160 V	18 V	36 V	80 V	160 V	36 V	80V	160V
80 A	40 A	20 A	9 A	4.5 A	80 A	40 A	20 A	10 A	80 A	40A	20A
8 mV	12 mV	17 mV	34 mV	75 mV	16 mV	20 mV	38 mV	80 mV	25 mV	48 mV	98mV
98 mV	182 mV	344 mV	748 mV	996 mV	196 mV	375 mV	800 mV	1,100 mV	398 mV	874 mV	1,240mV
46 mA	28 mA	10 mA	4 mA	2 mA	58 mA	38 mA	15 mA	8 mA	178 mA	64 mA	29mA
74 mA	36 mA	18 mA	9 mA	5 mA	140 mA	40 mA	20 mA	10 mA	296 mA	128 mA	58mA
2.5 mV	12 mV	15 mV	24 mV	122 mV	12 mV	15 mV	24 mV	122 mV	15 mV	24 mV	122 mV
2.5 mV	12 mV	15 mV	24 mV	122 mV	12 mV	15 mV	24 mV	122 mV	15 mV	24 mV	122 mV
40 mA	20 mA	15 mA	3.25 mA	2.13 mA	40 mA	20 mA	15 mA	12.5 mA	40 mA	20 mA	15 mA
40 mA	20 mA	15 mA	3.25 mA	2.13 mA	40 mA	20 mA	15 mA	12.5 mA	40 mA	20 mA	15 mA
4 mV	5 mV	9 mV	23 mV	50 mV	12 mV	35 mV	80 mV	180 mV	88 mV	198 mV	446 mV
25 mV	30 mV	50 mV	125 mV	250 mV	68 mV	100 mV	250 mV	550 mV	210 mV	596 mV	1,330 mV
2.5 mV	2.5 mV	3 mV	5 mV	8 mV	3.5 mV	4 mV	6 mV	10 mV	6 mV	9 mV	14 mV
49 mA	24 mA	13 mA	8 mA	4 mA	69 mA	32 mA	18 mA	10 mA	76 mA	37mA	22 mA
3 mV	3.5 mV	4 mV	6 mV	8 mV	4 mV	5 mV	7 mV	9 mV	7.5 mV	11 mV	14 mV
49 mA	24 mA	13 mA	8 mA	4 mA	69 mA	32 mA	18 mA	10 mA	107 mA	59 mA	29 mA
25 mV	29 mV	55 mV	110 mV	200 mV	38 mV	66 mV	134 mV	240 mV	78 mV	146 mV	294 mV
40 mA	28 mA	10 mA	4 mA	2 mA	64 mA	39 mA	15 mA	8 mA	188 mA	67 mA	32 mA
2.5 mV	12 mV	15 mV	24 mV	122 mV	12 mV	15 mV	24 mV	122 mV	15 mV	24 mV	122 mV
40 mA	20 mA	15 mA	3.25 mA	2.13 mA	40 mA	20 mA	15 mA	12.5 mA	40 mA	20 mA	15 mA

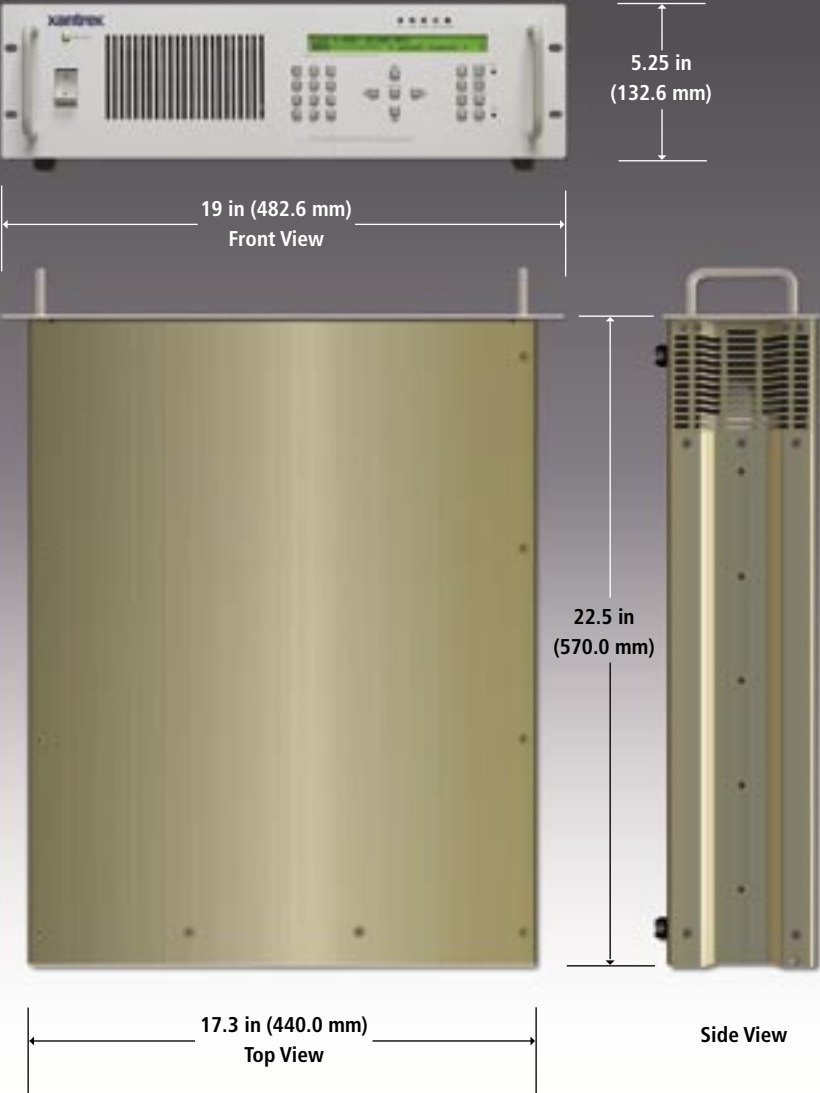
*(1) - Specifications subject to change without notice.

*(2) - Specifications refer to a chassis with only the specified module installed, with nominal resistive load (90% of rated current at the rated voltage) and the power supply sensing locally at the rear terminals, at 25°C.

*(3) - The time it takes for the output to recover within 75 mV of its previous level following a step change in load current of up to 10% of the rated module's current.

*(4) - The maximum output power is limited by the mainframe power envelope.

Mechanical Specifications



Dimensions without feet (H x W X D)	5.25 x 19 x 22.5 in (132.6 x 482.6 x 570.0 mm)
Weight	
XMP mainframe with controller	26.2 lb (11.9 kg)
1/8 width module	3.9 lb (1.75 kg)
2/8 width module	5.5 lb (2.5 kg)
3/8 width module	7.5 lb (3.4 kg)



Ordering Codes

Channel:		#1	#2	#3	#4	#5	#6	#7	#8				
XMP	XX	VIY	VIY	VIY	VIY	VIY	VIY	VIY	VIY	F	0	1	1

Relays option
Y = Module with disconnect and a polarity relays

Current code (1 to 5)
See table below for output current codes

Voltage code
A = 0-8V
B = 0-18V
C = 0-36V
D = 0-80V
E = 0-160V

Number of outputs per XMP mainframe with controller
01 = 1 Output
02 = 2 Outputs
03 = 3 Outputs
04 = 4 Outputs
05 = 5 Outputs
06 = 6 Outputs
07 = 7 Outputs
08 = 8 Outputs

Fixed Digits: 01

Front panel option
0 = Full front panel with keyboard
2 = Slave expansion mainframe blank front panel which has only line switch and line indicator.

		1/8 width	1/8 width	1/8 width	2/8 width	3/8 width
	V-Code	I-Code	1	2	3	4
0-8 V	A		20 A	40 A		80 A
0-18 V	B		10 A	20 A	40 A	80 A
0-36 V	C		5 A	10 A	20 A	40 A (*4)
0-80 V	D		2.5 A	5 A	9 A	20 A (*4)
0-160 V	E		1.25 A	2.5 A	4.5 A	10 A (*4)

* (4) - The maximum output power is limited by the mainframe power envelope.

XMP TM	Operator's Manual	One Operator's Manual included with the instrument
XMP LCON	One Output (load) connector	(One connector already supplied with each module)
XMP GPIB CBL	GPIB cable	(1 m)
XMP RM	Sliding rails for rack mounting	
XMP NET CBL	Extention net communication cable	(1.2 m)

XMP 2600 Order Example:

	X	M	P	-	0	4	-	A	1	Y	-	B	1	Y	-	B	2	Y	-	C	2	Y	-	0	-	0	1	-	1	
XMP with 4 outputs																														
0-8V/20A with relays																														
0-18V/10A with relays																														
0-18V/20A with relays																														
0-36V/10A with relays																														
Full front panel with keyboard																														
Mainframe controller power envelope:																														
2.4 kW continuous, 2.6 kW intermittent																														



About Xantrex

Xantrex Technology has been building advanced power electronics since 1983. Whether for the lab bench or for a computer-controlled console of rack-mounted test equipment, Xantrex offers the industry's most advanced designs of DC power supplies. A privately-owned company with 600 employees, Xantrex is headquartered in Vancouver, British Columbia.

xantrex™
Smart choice for power

Xantrex Technology Inc.

Headquarters
8999 Nelson Way
Burnaby, British Columbia
Canada V5A 4B5
604 422 8595 Phone
604 421 3056 Fax

5916 195th Northeast
Arlington, Washington
USA 98223

161- G South Vasco Road
Livermore, California
USA 94550

www.xantrex.com